

FIVE QUESTIONS

for a better world

Five talents working in the Netherlands, each from a different field, answer five questions that will feature during Leiden European City of Science 2022. These questions are important not only for science, but for all curious people. And they help us think about a better world. These talents want to contribute to this themselves.

Text: Marleen Hoebe
Photography: Bram Belloni



'I try to write my scientific articles to be more accessible'

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WHY ARE WE SO EAGER TO KNOW WHAT WE DON'T YET KNOW?

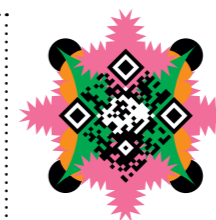
Noel de Miranda
Principal Investigator Cancer Immunogenetics,
Leiden University Medical Centre

'It is in our nature to want to know more; not only to better understand ourselves and our environment, but also to find solutions to current problems. Research can lead to new breakthroughs and, at the same time, to new questions that we want to answer. This creates progress; for example, we develop vaccinations that help reduce mortality.'

Every day, millions of people engage in an infinite puzzle. All are trying to solve a little piece of the problem. So do I, as a scientist in cancer research.

Not too long ago, there was a breakthrough in my field. Scientists had figured out what tools we can use so the immune system can recognise and destroy cancer cells. Patients are now benefiting from this.

Unfortunately, the tools don't work for every patient. My colleagues and I are trying to figure out how to help these patients in a different way. We think a lot about which immune cells might play a role. This is very complex, because we do not yet know how to use immunotherapy to control different immune cells. However, each discovery has the potential to become a therapy for a patient. It is, therefore, an honour for me to be able to do this research.'



HOW OPEN IS SCIENCE AND HOW OPEN CAN IT BE?

Sarah Schrader
Associate Professor of Osteoarchaeology,
Leiden University

'Science today is much more open than it was ten years ago. At that time, scientists were hardly publishing in open access journals that can be accessed online free of charge. I couldn't afford to publish in such journals eight years ago either. There was no money for it. Some research fields feel that open-access journals have less prestige. Within my field, we encourage scientists to publish in these journals. At Leiden

University, we have that option because the university has agreements with various publishers. More and more universities are doing this, but it is still not enough. More financial investment is needed to make science more accessible.

As a scientist, you yourself can also do something. I try to write my scientific articles to be more accessible. These are articles about research on human bones. By examining bones, I can learn more about the lives of people from the past, such as what they ate, whether they had diseases and whether they were immigrants.

I can even find out if someone had a high or low socioeconomic status. One of my studies of four-thousand-year-old bones shows that status had an impact on people's health even then. For example, people with low socioeconomic status could not go to the doctor and ate less healthily. I want to look at how that knowledge can help counter health inequalities today.'



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WHAT MAKES US HUMAN?

Meike Kombrink

PhD candidate at the Netherlands Forensic Institute

'I believe our brain in particular makes us human. The fact that this works so well sets us apart from animals and artificial intelligence (AI). Our brain is small *and* efficient. AI also tries to work well and efficiently but cannot do so without an extremely large numbers of computers. We humans don't need that much space for our brains, yet

we are very good at reasoning. AI has not reached that point yet.

But we can use AI for other things. In my research, I am now investigating whether we can intercept steganography with AI. Steganography is the hiding of messages in, for example, a photograph or video. We cannot see these messages. For example, there may be a very small colour change that is only visible when we start examining the bits of an image. And we cannot do that ourselves; we need a computer to process that information.

The interesting thing is that we don't know yet how common steganography is. That is because we have to look for something hidden. I hope eventually to be able to intercept steganographic messages and develop a method that makes it possible to collect useful evidence for court cases.'



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CAN HUMANS, ANIMALS AND NATURE EXIST IN BALANCE WITH EACH OTHER?

Aoife Fleming

Youth Representative for Sustainable Development, United Nations

'It is certainly possible for humans, animals and nature to live in balance with each other, but I have the impression that this has not been the case in the Netherlands for a very long time. In some other countries you do see that balance. For example, there are indigenous peoples who protect and manage forests. We can learn from that.

In the Netherlands, we assume we must keep growing and developing. But something really needs to change.

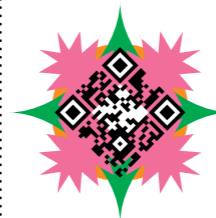


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I believe there are several ways we can live more sustainably. Young people can play a role in this. Together with other youth representatives, I researched what young people from different countries see as obstacles on the road to climate action. This revealed that there is not yet enough knowledge about sustainability available. Countries could solve this by offering more studies on sustainability. The questionnaires also showed that it is often difficult for young people to raise money if they want to start sustainable initiatives, because this money usually goes to companies.

I am now working with fellow representatives to get the International Court of Justice to give countries a recommendation on what they should do to protect future generations from climate change. This advice will help these countries to become more ambitious and to take action.

I hope that in 2030 we can look back with a good feeling and can say that we are on course for a climate neutral world.'



IS EVERYONE EQUAL?

Angelo Accardo

Assistant Professor of Precision and Microsystems Engineering, TU Delft

TU Delft does its best to promote equal opportunities for men and women. The number of male researchers is high - this is more often the case at technical universities - but more and more women are joining the ranks. This is partly due to the Delft Technology Fellowship, an initiative of the university that offers appointments to outstanding female scientists.

In addition, every scientist can qualify for a Dutch or European grant to start or

strengthen his or her career as a researcher. More and more foreign scientists like me are taking advantage of this and are joining Dutch universities like TU Delft. It is great to see.

I recently received two Dutch grants for my research. I use a 3D printing method using light to create small, plastic 3D environments. In these structures, it is possible, among other things, to grow and study cells outside the human body. This helps my colleagues and me to better understand the behaviour of cells.

We are also researching different therapies in these microenvironments to assess the efficacy of very recent cancer treatment methods such as proton therapy in the brain. In this way, we can determine what dose of protons is needed to destroy cancer cells. Our goal is to use these 3D models to reduce the amount of animal testing that is currently necessary to treat human patients.' ■